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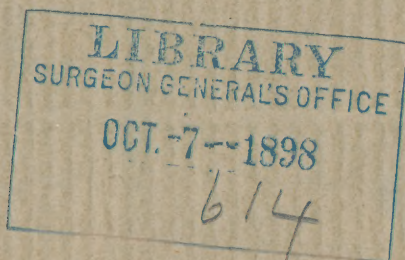
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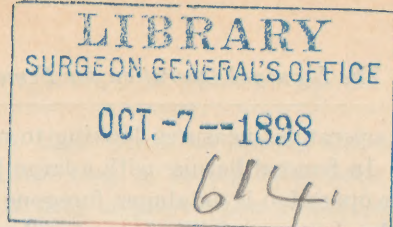
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THE INGUINAL OPERATION FOR FEMORAL HERNIA.*

BY

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Femoral or crural hernia is more common among women than men, and therefore proportionately more likely to come to the notice of the gynecologist. Greater width of the female pelvis, larger diameter of the crural ring, and relaxation of the fasciæ following delivery, explain the greater frequency of femoral hernia in women. BASSINI (2) operated upon forty women as against only eleven men for the radical cure of femoral hernia.

Femoral herniæ, in the vast majority of cases, are small, those attaining the size of a fist and over being comparatively rare. Indeed, they are often so small as almost to defy detection, and sometimes to place us face to face with the necessity of diagnosing between irreducible femoral hernia and an enlarged inguinal gland. The great majority of femoral herniæ which I have met with were irreducible, wholly or in part. If the hernial protrusion consists of omentum or an appendix epiploica, these structures, owing probably to the frequently repeated mechanical insult offered by flexion of the thigh upon the abdomen, soon become adherent. If the hernia be an entero-epiplocele, the intestinal portion frequently remains reducible, while the fatty contents become adherent to the irreducible hernial sac.

The aperture through which a small femoral hernia descends is likely to be small, and for this reason small femoral herniæ readily become strangulated. Clinical experience teaches that an operation performed *solely* for the relief of strangulation is much more likely to be followed by radical cure in the case of a femoral hernia than in the case of an inguinal hernia. This holds true, however, only for small femoral herniæ, which show this proneness to permanent disappearance following an operation to relieve strangulation, although at the time of such operation

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no special operative measures looking to radical cure have been adopted. In femoral herniæ with a large hernial aperture, recurrence after operation is an almost foregone conclusion, unless the operation has been carefully planned and carried out with a view to radical cure.

SALZER (16) quotes HEIDENTHALER as stating that crural herniæ under the size of a hen's egg yield three radical cures for each relapse after operation, while in those above that size two relapses are observed for every radical cure.

Femoral herniæ, then, of small size, after reduction, followed by separation, high ligation and amputation of sac, are often radically cured by drawing together the walls of the canal or the margins of the saphenous opening by a suture or two passed in almost any direction, or even by merely closing the skin without any fascial suture whatsoever. In spite of this fact, however, taking femoral herniæ as they come, large and small, there will be more failures to obtain radical cure in a given number of femoral than in an equal number of inguinal herniæ. This is because the technics of the operation for the radical cure of femoral hernia, as well as the principles upon which the technics are based, are not so unequivocally and finally defined and settled, as in the case of inguinal hernia. We do not as yet possess for femoral hernia the full equivalent of the Bassini operation for the radical cure of inguinal hernia, although the same master mind has given attention and thought to both varieties of rupture.

Practically all writers upon the subject agree upon the importance of two procedures, high ligation of the sac and clearance of the canal of all fat, connective tissue, lymphatics and glands, in the operation for the radical cure of femoral hernia. TRENDLENBURG (7) fastens the amputated hernial sac to Poupart's ligament or the anterior abdominal wall. KOCHER (8) ligates the inverted sac, pulls it through a small incision made in the aponeurosis of the external oblique, then folds it back and down over Poupart's ligament, uniting it to the latter and the pectineal fascia by a suture closing the saphenous opening. BERGER (7) and O'HARA (7) do about the same as KOCHER, the former drawing the sac through an opening in the abdominal muscles and suturing it beneath the skin, closing the canal by a purse-string suture embracing Poupart's ligament and the pectineal fascia. The inguinal operation for the radical cure of femoral hernia, to be described later on, is believed to afford superior facilities for high ligation of the sac, complete clearing of the canal and effective closure of the crural ring and canal by suture.

Up to within the past eight years no serious and systematic attempts to close the crural ring by suture have been reported. Operators in general, if they employed the suture at all, contented themselves with a few sutures applied to close the saphenous opening.

According to WOLTER (20) the idea of closing the hernial gate (*Bruchpforte*), by which term seems to have been meant the saphenous opening, and, perhaps, the lower end of the crural canal, is old, CELSUS having attempted it with the cautery. GROSS, in 1858, was the first to close the hernial aperture *by suture*, using silver wire. After the establishment of the antiseptic period, STEELE, in 1874, took up the idea of closing the hernial gate by suture. Since then BASSINI, beginning in 1883, and SCHEDE, who began to use buried silver wire in 1887, and, perhaps, a few others, took up the idea of closing the canal and the saphenous opening by suture. But not until within the past eight years were serious and systematic attempts in this direction made by surgeons in general.

Coming now to discuss the more substantial progress made within recent years in the operation for the radical cure of femoral hernia, which progress, in its highest development, is represented by the attempt to close the crural ring as well as the canal and the saphenous opening, we may divide the operative procedures employed into three classes: (1) those undertaken from below Poupart's ligament; (2) those undertaken partly from below and partly from above; and (3) those undertaken entirely or mainly from above Poupart's ligament.

Of those who operate through an incision below Poupart's ligament, BOTTINI (3) unites the margins of the crural ring from below upward to Gimbernat's ligament. He reports nine operations, all with good results. GUARNERI (3) follows much the same method, uniting Gimbernat's to Poupart's ligament. LAUENSTEIN (7) in one case united Gimbernat's ligament to the falciform process of the fascia lata. CZERNY (7) and SCHEDE (7) unite Poupart's ligament to the adductor fascia. SALZER (16) states that BILLROTH unites the mesial part of Poupart's ligament by three strong silk sutures to the deep fascia of the adductor muscles or to the median portion of the sheath of the femoral vessels. WOOD (21) unites Poupart's ligament and the pubic portion of the fascia lata by a few sutures.

In addition to giving us an operation for the radical cure of inguinal hernia which has revolutionized the operative treatment of that variety of hernia, and which is almost universally accept-

ed by modern surgeons the world over as the *ne plus ultra* of perfection, BASSINI (2) appears to deserve the credit, also, of being the first to make systematic, continued and rational attempts at the radical cure of femoral hernia by suturing crural ring, canal and saphenous opening. BASSINI (2) reports 54 operations upon 40 women and 11 men, three patients being operated upon on both sides. The operations were uniformly successful, and the results lasting; the first operation bearing date of October 16, 1884. Emanating from such a source, and with such a record, the guiding principle of BASSINI's operation for the radical cure of femoral hernia, obliteration of the crural ring and femoral canal, bids fair soon to receive the general acceptance and endorsement which are now so fully accorded his operation for the radical cure of inguinal hernia.

BASSINI argues that the point of constriction in strangulated femoral hernia is not at the upper entrance, but rather near the outer end of the femoral canal, and for this reason, probably, he does not carry the sutures closing the crural ring quite as high as seems desirable to some other operators, amongst whom the writer. BASSINI unites the inner end of the arcus cruralis (Poupart's ligament) with the aponeurotic covering of the crista pectinea, and the plica falciformis to the fascia lata pectinea.

FABRICIUS (5, 6), is among those who attempt a higher closure of the crural ring than BASSINI, believing the interposition of the pectineus muscle to be a source of weakness. He incises Poupart's ligament at the spine of the pubis in order to allow of convenient approximation antero-posteriorly, and then tries to sew Poupart's ligament to the inner margin of the horizontal ramus of the pubis, and, if possible, to Cooper's ligament. His sutures embrace Poupart's ligament, pectineal fascia, the fibres of origin of the pectineus muscle, and periosteum. VON FREY publishes five cases from WOELFLER's clinic, operated upon after FABRICIUS, with full success in each. To the writer it seems at least doubtful if the advantage accruing from readier approximation of the margins of the crural ring compensate for the evident disadvantages and drawbacks of cutting away Poupart's ligament from its attachment to the pubic spine. In small femoral herniæ, my experience teaches me that this procedure is not necessary, while in large herniæ, with large, dilated and relaxed crural ring, it is certainly superfluous. STINSON (17) has recently proposed a method of operation for the radical cure of femoral hernia, which he seems not as yet to have put into practice, but which is based upon the same principles as the operation of BASSINI, from which it does not materially differ.

A radical departure in the operation for the radical cure of femoral hernia was made by TRENDELENBURG when, in 1891, he attempted the permanent plugging of the hernial canal by an osteo-periosteal flap taken from the anterior surface of the pubic bones. TRENDELENBURG's operation, as described by HACKENBRUCH (7), begins by a long incision reaching from the pubic spine of the healthy side to the anterior inferior iliac spine of the affected side. A second incision, perpendicular to the first, was made in the event of the hernia being unusually large. After fastening the stump of the amputated hernial sac to Poupart's ligament or the anterior abdominal wall, he detaches both recti abdominis muscles from the horizontal rami of the pubic bones, and partially separates the gracilis and adductor magnus from the descending rami. He then cuts an osteo-periosteal flap, two centimeters wide and several millimeters in thickness, from the anterior surface of both pubic bones, beginning on the healthy side at a distance of one to two centimeters from the symphysis and reaching across to the spine of the pubis on the hernial side. The osteo-periosteal flap includes the symphysis and remains broadly attached by periosteum near the pubic spine. The bone segment with the periosteum backward and the raw bone surface forward, is turned upward into the hernial canal, the upper free end being slipped beneath Poupart's ligament, to which it is attached by catgut sutures. The large wound is drained in two or three directions. TRENDELENBURG's results, as detailed by HACKENBRUCH (7), are none too brilliant as far as radical cure is concerned; it should be borne in mind, however, that the herniæ operated upon and the hernial apertures were all very large. KRASKE (10), KOERTE (9) and WOLFF (9) report cases operated upon by closing the hernial aperture by an osteo-periosteal flap.

POULLET (12) closes either the inguinal or the femoral aperture, according to the variety of the hernia, by a fibro-periosteal flap taken from the pubic bone and the fascia covering the superficial adductor muscle. The pubic bone is denuded of its periosteum from symphysis to spine, the vertical width of the flap being two centimetres. One end of the fibro-periosteal flap remains broadly attached; the free ends are sewn to the margins of either the saphenous opening or the external inguinal ring. POULLET reports three recent cases of femoral hernia in women operated upon after his method.

KOCHER, BERGER and O'HARA, whose methods have already been described, operate for the radical cure of femoral hernia partly from above and partly from below Poupart's ligament.

Coming now to operations for the radical cure of femoral

hernia performed from above Poupart's ligament, ANNANDALE (1) in 1876, appears to have been the first to recognize the possibility and to test the practicability of the inguinal operation for the radical cure of femoral hernia. In a case presenting both an inguinal and a femoral hernia of the right side, he made the usual incision for inguinal hernia and found that the femoral hernia became reduced during his operation upon the inguinal. He plugged the crural canal with the ligated sac of the inguinal hernia. The inguinal hernia remained cured, the femoral recurred. A year later he reported a second case of femoral hernia operated upon by the same method and remaining cured four months after operation.

In presenting his second case, ANNANDALE condemns the fixation of the sac in the canal. In regard to this point, HACKENBRUCH (7) quotes GLASER as saying: "The sewing of the sac stump into the canal is a serious error." Indeed, the presence in the canal of any tissue or foreign body softer in consistence than the canal walls themselves, constitutes an element of weakness. SALZER (16), who in one case of large femoral hernia recurring after operation, operated successfully by placing a plug of glass wool in the dilated femoral canal and allowing it to heal therein, abandoned this procedure. In a subsequent case, also operated upon from below, he dissected up a large flap of pectineal fascia, leaving it attached above, and sewed the lower free end to Poupart's ligament.

H. W. CUSHING (4), in a case of femoral hernia reported in 1888, worked his way down to the crural ring between the spermatic cord and the outer pillar of the external inguinal ring, drew back the hernial sac, padded it *a la Macewen* and closed the crural ring by sewing Poupart's ligament to the pubic portion of the fascia lata and the fascia covering the pectineus muscle. He then closed the saphenous opening. The patient remained cured after six months.

RUGGI (14, 15), has twice described his procedure. His second description, slightly modifying the operation as originally proposed by him, is to the effect that he incises the inguinal canal, draws the spermatic cord or round ligament upwards out of the way, and cuts through the posterior wall of the inguinal canal. After reduction of the hernia and attention to the sac, he closes the crural ring by uniting Poupart's ligament (*l'arcade crurale*) to the ligament of Cooper. In certain cases, presumably of large hernial aperture, he forms a flap from the aponeurosis of Cooper and uses it to close the crural ring.

PARLAVECCHIO (11) follows RUGGI in every particular except incision of the whole length of the anterior wall of the inguinal canal. His incision stops short by half a centimeter of the outer pillar of the external inguinal ring. He thus endeavors to leave intact the external as well as the internal inguinal rings.

TUFFIER (19) describes his method of operation as "the second procedure of RUGGI, a simplified PARLAVECCHIO, and without aponeurotic transplantation." His incision of the inguinal canal corresponds to that of PARLAVECCHIO, the balance of his technics is derived from RUGGI. He operated thus upon seven patients with one relapse; the first operation bearing date of February 28, 1894.

REED (13), in his paper entitled: "A new operation for the radical cure of inguinal and femoral hernia," fails to describe his operation for the latter. Inguinal hernia he attacks by an incision into the abdomen *above* the inguinal canal, and operates upon the internal inguinal ring from within. It is practically the widely known operation of LAWSON TAIT, modified only as to the site of incision.

The procedures advocated by PARLAVECCHIO, TUFFIER and REED are all dominated by the fear of opening the entire length of the anterior wall of the inguinal canal, a fear unintelligible to those who believe they can make the inguinal canal as strong, if not stronger than before operation, and in the case of women obliterate it entirely, by a proper application of the principles underlying BASSINI'S operation for the radical cure of inguinal hernia.

The writer's personal experience with the inguinal operation for femoral hernia, embracing four cases of which the first was operated upon December 29, 1893, has not been especially felicitous. This is due in part to the circumstance that two of his four patients were mentally irresponsible and absolutely unmanageable, removing their dressings and leaving their beds at will, wound infection and suppuration being the consequence, and in part to the fact that the Bassini method for closing the inguinal canal was followed in the last case only. The femoral hernia recurred in one of the four patients six months after operation; the other three patients remained cured of their hernia when last seen, two-and-a-half years, ten months, and two months, respectively, after operation. In three of the cases the incision was carried through the inguinal canal, the anterior wall of which was opened along its entire length; in the fourth case, the abdomen was opened along the outer border of the rectus muscle, the lower end of the incision extending to Poupart's ligament. Three of the

cases required a small supplementary incision over the femoral tumor to liberate the adherent hernial sac. In all of them the sac was drawn upward into the abdomen and out of the inguinal wound, and again dropped, after high amputation in two, and unopened in the other two cases. In three of the patients the femoral canal, after clearing, was closed from above by sutures, in one case of silk, in the second of silkwormgut, and in the third of chromicized catgut. The sutures closed the crural canal by uniting Poupart's ligament to the periosteum of the os pubis just behind the ileo-pectineal line. In the fourth case, a small fibro-periosteal flap, with its attached base downward, was formed from the periosteum of the pubis and the upper margin of the fibrous aponeurosis of the pectineus muscle, the free end of the flap being sutured to Poupart's ligament. The saphenous opening was closed by a few sutures attaching the falciform process to the fascia pectinea. On all but the first patient, operations additional to that for female hernia were performed at the same sitting.

CASE I.—A. T., aged forty-one, mother of one child, widow, came under my care in September, 1889, after an unsuccessful operation for retroversion of the uterus performed a few months previously. On September 22, 1889, I performed ventral fixation to the uterus, the tubes and ovaries being found in normal condition. Wound suppuration and subsequent ventral hernia were the result of repeated removal, by the patient, of the primary dressings.

In October, 1893, I found a right femoral hernia, an irreducible entero-epiplocele of the size of a hen's egg, and a bilateral salpingo-oophoritis, in addition to the ventral hernia. On November 14, 1893, I performed curettage of the uterus, bilateral salpingo-oophorectomy, and radical ventral herniotomy. Numerous and universal adhesions were found, in separating which a hole, two centimeters in length, was torn in the small intestine and immediately closed by sutures. An attempt to reach the femoral ring from within failed, owing to the inseparable adhesions in that vicinity. This time we obtained primary union in spite of the patient.

On December 29, 1893, I operated for radical cure of the femoral hernia, working my way through the inguinal canal down to the crural ring, without opening the peritoneum. Sac of femoral hernia reduced unopened. Crural ring closed by three silk sutures approximating Poupart's ligament and the periosteum of pubic bone. Posterior wall of inguinal canal closed by catgut sutures. Drainage of deep parts of wound by strands of silkwormgut. As usual, the patient repeatedly removed her dress-

ings as well as the drains. Suppuration followed and all the buried sutures were removed. Six months after operation the femoral hernia recurred, being then of the size of a large chestnut, and the hernial aperture was found much larger than before operation.

CASE II.—A. B., aged twenty-nine, married, mother of four children, presented herself in May, 1894, with retroversion of uterus, bilateral laceration of cervix, chronic metritis, movable right kidney, reducible right inguinal hernia, and irreducible right femoral hernia. Both of the latter were acquired suddenly as the result of very strong expulsive efforts during the birth of her last child, fifteen months previously: The femoral hernia, an entero-epiplocele about three centimeters in diameter, was temporarily greatly increased in size by coughing or straining. On May 4, 1894, I performed curettage of uterus, amputation of cervix, shortening of round ligaments, and radical inguinal and femoral herniotomy. Same technics as in previous case, except that three silkworm sutures were used to close the crural ring and that the silkworm sutures closing anterior wall of inguinal canal included the round ligament. Superficial suppuration necessitated removal of the sutures closing the aponeurosis of the external oblique; the sutures closing the crural ring were not infected and remain buried. Pregnancy in November, 1895, during which the inguinal hernia recurred. Delivered in August, 1896, of a living child; transverse presentation; version and forceps to after coming head. On October 24, 1896, two months after delivery, the right femoral hernia remains cured, but a new femoral hernia has developed on the left side.

CASE III.—J. F., aged twenty-seven, married, mother of one child. Some five or six weeks following a miscarriage in November, 1893, she had both tubes and ovaries removed by abdominal section. In July, 1894, she first came under my care suffering from painful masses at either uterine cornu, excessive uterine hemorrhages, and a right femoral hernia. The latter a reducible entero-epiplocele, reached the size of a hen's egg on straining or coughing. On July 27, 1894, I performed curettage of the uterus, trachelorrhaphy, removal of the stumps of both uterine adnexa, excision of a diseased vermiform appendix adherent to the right stump, ventral hysteropexy and radical femoral herniotomy. All the intra abdominal work, including closure of the crural ring, was performed through an incision along the outer margin of the right rectus muscle, the lower end of the incision reaching Poupart's ligament. The crural ring was closed by two rows of sutures of chromic catgut. The femoral hernia remained cured on May 11, 1895, when I last saw the patient.

CASE IV.—A. S., thirty-seven, married, mother of five children, came under observation October 15, 1896. She had chronic metritis, retroversion of uterus, and right femoral hernia. The latter was a small, irreducible epiplocele. There was, in addition, a suspicion of incipient intrapelvic neoplasm. On October 27, 1896, after curettage of the uterus, an exploratory coeliotomy disclosed incipient multiple papillomata of the peritoneal surfaces of both tubes and of the broad ligament. The papillomata were scraped away, inversion of the vermiform appendix was performed, and the abdomen closed. An incision was next made over and into each inguinal canal, that on the right side being deepened down to the crural ring. Peritoneum opened, femoral hernia drawn back into abdomen, sac liberated and ligated high up. A small fibro-periosteal flap was formed from the superior border of the horizontal ramus of the os pubis and the pectineal fascia. Its broad base directed toward the thigh remained attached, the free border was sewn with forty-day catgut to Poupart's ligament. The round ligaments were next shortened and both inguinal canals closed after the manner described by the writer. (EDEBOHLS, Shortening the Round Ligaments. *American Gyn. and Obst. Journal*, December, 1896). The patient made a good recovery, with the exception of a small hæmatocele which formed in one of the incisions and delayed complete union of that wound. She remains cured of the femoral hernia, and otherwise well, two months after operation.

Judging from my own experience, derived from the above four cases of inguinal operation for femoral hernia, as well as from a larger number operated upon from below Poupart's ligament, I should say that severance of Poupart's ligament from the pubic spine, as advocated by FABRICIUS and osteo-periosteal transplantation as practiced by TRENDLENBURG are rarely, if ever, necessary to insure radical cure of femoral hernia. Neither of the two is an indifferent procedure, to say the least, and the extensive bone transplantation of TRENDLENBURG impresses the writer as a serious matter, in view of the fact that simpler expedients can be made to answer just as well. The truth of the latter statement is borne out by the experience of BASSINI, the largest and most favorable recorded. The fibro-periosteal flap taken by POULLET from the anterior surface of the pubic bone and sutured to either the external inguinal ring or the saphenous opening of the fascia lata is applied at a mechanical disadvantage; the barrier to the descent of a femoral hernia should be applied higher up at the crural ring.

Conclusions.—The classical operation from below Poupart's

ligament should be the operation of choice for femoral hernia, the inguinal operation being performed only upon special indications.

In the absence of such special indications for the performance of the inguinal operation for femoral hernia, the writer would prefer the method of BASSINI, modified so that the uppermost sutures would include Poupart's ligament and the periosteum of the os pubis.

When the inguinal operation for femoral hernia is indicated the best method of performing it is to open the anterior wall of the inguinal canal from external to internal ring, hook the spermatic cord or round ligament upward out of the way, and cut through the posterior wall of the inguinal canal. After reduction of the hernia, liberation and high ligation of the sac, and clearing of the femoral canal, the crural ring, if small, should be closed from above by suturing Poupart's ligament to the periosteum of the horizontal ramus of the pubis. Should the hernial aperture be large a fibro-periosteal flap should be formed and used, in the manner described, to close the crural ring. In either case the irritation of the periosteum produced tends to new formation, in and about the crural ring, of osseous tissue which will constitute an efficient barrier, efficiently placed, against the redescend of a hernia. The saphenous opening may then be closed by sewing the falciform process to the pubic portion of the fascia lata, although this procedure is of secondary importance. The posterior wall of the inguinal canal is reunited by suture, and the inguinal canal reconstructed after the manner of BASSINI's operation for the radical cure of inguinal hernia.

The chief advantages of the inguinal operation for femoral hernia are the possibility and easy performance of high ligation of the hernial sac, and of high and effective closure of the crural ring.

The special indications for the inguinal operation for femoral hernia are :

1. The co-existence of complete or incomplete inguinal hernia with a femoral hernia of the same side.
2. In women, the co-existence, with femoral hernia, of a retro-displacement of the uterus which can be corrected by shortening the round ligaments.

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